

REMARKS

Claims 1-11 are all the claims pending in the application. In order to clarify the invention, Applicant amends claim 1.

Applicant respectfully submits that claims 1-3 are patentably distinguishable from U.S. Patent No. 5,126,956 to Komiya et al. (hereinafter "Komiya") for at least the following reasons. Claim 1 is an independent claim. Claim 1, as now amended, among a number of unique features, recites:

...an available area for storing circuit elements of a circuit pattern being input;
circuit pattern extracting means for making a comparison between a circuit element stored in said available area and a corresponding circuit element...stored in said unavailable area;
copying means for copying the extracted circuit pattern into said available area in response to an input by an operator.

In the Final Office Action dated March 9, 2004, the Examiner asserts that claim 1 is directed to a ladder circuit editing system and is anticipated by Komiya. The Examiner alleges that Komiya's character generator (CG) and refresh memory (RFM) are similar to the unavailable storage means, as set forth in claim 1, Komiya's picture memory (IMM) is similar to the available storage means, as set forth in claim 1, and that Komiya's display controller (DPC) is similar to the extracting means and copying means, as set forth in claim 1 (see pages 5-6 of the Office Action). Applicant respectfully disagrees.

Applicant has carefully studied Komiya's discussion of the method and the apparatus for displaying segments of a ladder diagram responsible for turning on an operator specified relay, which is not similar to the editing system, as set forth in claim 1. For example, if as alleged by the Examiner, the DPC and the IMM of Komiya are similar to the extracting means and the available area, respectively, then the DPC does not compare a circuit element from stored in IMM with circuit elements stored in RFM and/or CG.

Komiya provides a method and an apparatus for displaying a ladder diagram for facilitating the debugging and maintenance of a sequence program. Moreover, Komiya teaches showing only the segments of the ladder diagram indicating the conditions for turning the relay on when the user enters the identification of a desired relay or a memory address storing the state of the relay (col. 5, lines 46 to 58).

In particular, Komiya teaches displaying ladder diagram segments indicating the conditions which turn a relay on by (1) entering either the identification of a relay such as a control relay or output relay or a memory address storing the state of the relay through use of an input device, (2) selecting the item of sequence data which indicates the conditions for turning the relay on, using the relay identification or memory address, and (3) displaying the ladder diagram segments that are based on the item of sequence data selected (col. 6, lines 45 to 58).

Komiya teaches the universal display unit 301h having a display controller DPC, a refresh memory RFM connected to the DPC, for storing the sequence program data transferred from the ROM 301d following its conversion into picture information by the display controller

DPC. In addition, Komiya teaches a memory MEM for storing the corresponding relationships transferred from the table 301f, a character generator CG for storing various alphanumeric characters and symbolic patterns illustrative of a ladder diagram, and a picture memory IMM for successively storing items of picture data generated by the character generator CG based on the picture information, whereby all picture information for displaying a single frame is stored. Finally, Komiya teaches a drive DDV which receives the picture information output of the IMM for driving a cathode ray tube CRT on the basis of the received information, whereby the CRT will display the stored picture (Fig. 8; col. 7, lines 21 to 38).

The Examiner alleges that IMM is equivalent to the available area as set forth in claim 1. Applicant respectfully disagrees. The IMM only stores the final product for the display on the cathode ray tube CRT (col. 9, lines 1 to 2). In other words, there is no comparison between the picture stored in IMM and the sequence data stored in the refresh memory. In fact, pictures stored in the IMM are not compared with anything. Instead, they are only displayed on the CRT. In short, Komiya's IMM cannot be equated to the available memory as set forth in claim 1.

Komiya also teaches selectively displaying only the segments constituting the ON conditions of a desired control relay or output relay. In particular, the operator keys in the identification of the desired relay or the memory address at which the state of the desired relay is stored. When signals indicative of the relay identification and ON conditions display mode enter the numerical control system, the data processor 301m delivers these signals to the universal display unit 301h and then sends the display unit a sequence program data starting from the beginning of the sequence program.

Komiya further teaches that within the DPC, the relay identification entered by the operator is stored in a register RG, and the controller CNT is set in a mode for selectively displaying only segments which constitute the ON conditions of the relay signal entered by the operator. One unit of the sequence program data, extending from the operation code RD to the operation code WRT, is stored in a buffer register BFR instruction-by-instruction. When one input unit of the sequence program data enters the buffer BFR, a discriminator DIC discriminates the operation code WRT and goes to the MEM to read out the relay identification using, as a key, the address and bit position of the data memory corresponding to the programmed operand following the operation code WRT. The identification is delivered to a comparator COM. The latter compares the relay identification entered by the operator with the relay identification output of the discriminator DIC and sends the result of the comparison, namely whether the two identifications do or do not agree, to the CNT.

In Komiya, if the two do not agree, then the CNT requests a transfer of the next input unit of the sequence program data and the foregoing operations are repeated. If the two do agree, the controller CNT causes a picture converter ITU to convert the unit of sequence program data stored in the buffer register BFR into picture information, this information then being stored in the refresh memory RFM. Thus, picture information regarding the sequence program data which includes the entered relay signal identification is stored in the refresh memory RFM. The character generator CG generates a picture based on the picture information stored in the RFM and the final picture is stored in the picture memory IMM and displayed on the cathode ray tube

CRT (Fig. 11; col. 8, line 13 to col. 9, line 5). Consequently, the cathode ray tube will display only the ladder segments in which the relay identified by "CRA" is to be turned on (Fig. 12).

In Komiya, however, the BFR stores a unit of the sequence program and the RG stores the relay identification input by the operator. The COM compares the two and if a match is found, it is stored in the RFM. In other words, Komiya does not teach or suggest copying the extracted circuit into the RG. Instead, the extracted circuit is copied into the RFM memory for generating a picture.

In sum, Komiya teaches a program for displaying a ladder diagram of a sequence program or displaying particular parts of the sequence program in response to an operator input. Komiya, however, is not related to a ladder circuit editing system, where the system may retrieve analogous ladder diagrams. Komiya teaches displaying a sequence program in a ladder diagram or displaying portions of the sequence program in a ladder diagram based on the input from the operator. Komiya, however, is no different from the prior art disclosed in the background of the invention. Komiya teaches generating a ladder diagram but fails to teach or suggest a ladder circuit editing system.

In short, if the Examiner alleges that Komiya's IMM is equivalent to the available area, then Komiya clearly fails to teach or suggest comparing an element of the circuit pattern from said available memory to the ones stored in the RFM (the alleged unavailable memory). In Komiya, the sequence program or portions of the sequence program stored in the RFM are used to produce a ladder diagram (a pattern) by using the CG, and the final result is stored in the

IMM. Pictures stored in the IMM are not compared with anything else. That is, extracting means, as set forth in claim 1, use the circuit elements stored in the available area for comparison, whereas in Komiya, the circuit patterns stored in the IMM are the end results of all operations by the DPC. No further operations are performed on the circuit patterns stored in the IMM, these circuit patterns are only displayed on a screen

On the other hand, if the Examiner alleges that the available memory is equivalent to the RG of the DPC, then Komiya clearly fails to teach or suggest a copying means for copying the extracted circuit pattern into said available area in response to an input by an operator. In Komiya's DPC, an operator inputs a relay identifier which is stored in the RG (allegedly the available memory) and this inputted identifier is compared with the portions of the sequence program obtained from the BFR. If the comparison results in an agreement, then this portion of the sequence program is stored in a RFM and not in the RG. In other words, Komiya teaches storing the results in RFM to generate a ladder diagram for a display, and not in the RG.

Moreover, once the user inputs the desired relay identifier, the system processes autonomously without further user input. In other words, Komiya fails to teach or suggest copying the extracted portion of the sequence program in response to user input. That is, in Komiya, once the comparison is made, the system automatically stores the portion of the sequence program resulting in agreement with the relay identifier from the RG in the RFM memory. In short, Komiya fails to teach or suggest "extracting from the plurality of previously stored circuit patterns an extracted circuit pattern in which the comparison indicates an agreement between the compared circuit elements; and copying the extracted circuit pattern into


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said available area in response to an input by an operator". In short, Komiya clearly fails to teach or suggest an available area as set forth in claim 1. Applicant respectfully submits that claim 1 is patentably distinguishable from Komiya. Also, Applicant respectfully submits that claims 2-3 are allowable at least by virtue of their dependency on claim 1.

Entry and consideration of this Amendment are respectfully requested.

Respectfully submitted,



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